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The Efficacy of Cognitive Behavioral Play Therapy on Behavioral Problems and Gross Motor Skills in Children with Intellectual Disability

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ABSTRACT

Aims: The present study aimed to investigate the efficacy of Cognitive-Behavioral Play Therapy (CBPT) on behavioral problems and gross motor skills in children with Intellectual Disability (ID).

Method and Materials: This study was designed as a quasi-experimental study with a pre-test, post-test, and control group design. The population consisted of 7-10-year-old educable children with ID referred to special schools in Rasht, Iran, in the academic year 2025-2026. Using a multi-stage sampling method, 38 children exhibiting behavioral disorders were selected and randomly assigned to experimental (N=19) and control groups (N=19). An approach of CBPT was administered to the experimental group according to the protocol of Knell for 12 sessions of 60 minutes, and the control group received no treatment. The instruments used were the Rutter Behavioral Problems Scale (RBPS) and the Bruininks-Oseretsky Test of Motor Proficiency (BOTMP), and the data obtained were analyzed by multivariate analysis of covariance (MANCOVA).

Findings: The results demonstrated that CBPT significantly decreases aggression and hyperactivity (F = 63.79), anxiety and depression (F = 37.36), social maladjustment (F = 55.36), antisocial behaviors (F = 50.31), attention deficit (F = 61.81), and increases gross motor skills (F = 77.78) in children with ID (P< 0.001).

Conclusion: The findings suggest that CBPT is an effective intervention for reducing behavioral problems and enhancing gross motor skills in children with ID. Therefore, this therapeutic approach may be considered a practical and beneficial strategy in educational and rehabilitation settings.

Keywords: Cognitive-Behavioral Play Therapy; Intellectual Disability; Behavioral Problems; Gross Motor Skills; Children

Introduction

Children with Intellectual Disability (ID) experience significant limitations in intellectual functioning and adaptive behaviors, which affect their conceptual, social, and practical skills across daily life [1]. These limitations typically emerge during the developmental period and influence academic performance, communication abilities, problem-solving skills, and independent functioning [2]. Beyond cognitive challenges, children with ID often face social difficulties, including problems with peer relationships, emotional regulation, and social participation [3]. They may also be at increased risk for co-occurring psychological or behavioral concerns, which can further impact their overall development and quality of life [4]. Nair et al. [5] reported that in 2019, the global prevalence of ID was 107.62 million individuals (1.74%), with slightly higher rates in males than females. Prevalence was highest in low-middle SDI regions and lowest in high SDI regions, with widening inequalities between low- and high-SDI regions over time.

Children with ID frequently experience a range of behavioral problems that are closely related to their cognitive and adaptive functioning limitations [6]. Difficulties in understanding social expectations, expressing needs effectively, and regulating emotions may increase the likelihood of behaviors such as aggression, impulsivity, noncompliance, and social withdrawal [7].

These behavioral challenges are not only influenced by cognitive delays but also by frustration resulting from communication difficulties, academic struggles, and limited social competence [8].

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As a result, behavioral problems are commonly reported among children with ID and can significantly interfere with their educational progress, social relationships, and daily functioning [9]. Furthermore, behavioral problems may create additional challenges for families, teachers, and caregivers who are responsible for supporting the child's development [10]. Persistent disruptive or maladaptive behaviors can limit participation in classroom activities, reduce opportunities for social interaction with peers, and negatively influence self-confidence and emotional well-being [11].

Children with ID often show delays in the development of gross motor skills, which involve the coordinated use of large muscle groups for activities such as walking, running, jumping, and maintaining balance [12]. Cognitive limitations may affect motor planning, coordination, and the ability to learn complex movement patterns, which can lead to slower acquisition of fundamental motor skills compared with typically developing children [13]. These motor difficulties may reduce children's participation in physical activities, play, and sports, limiting opportunities for physical development as well as social interaction with peers [14]. In addition, limited gross motor competence may influence other aspects of a child's development, including physical fitness, self-confidence, and independence in daily activities [15]. Children who struggle with movement coordination may avoid physical tasks or become less engaged in active play, which can further hinder their motor development and overall well-being [16]. Therefore, promoting gross motor skill development through structured physical activities, therapeutic programs, and supportive educational environments is an important component of intervention for children with ID, helping them improve physical abilities, enhance participation in social activities, and achieve greater functional independence [17].

Children with ID often experience various psychological and behavioral challenges that stem from limitations in cognitive functioning, communication abilities, and adaptive skills [18]. These difficulties may make it harder for them to understand and regulate their emotions, manage frustration, and respond appropriately to social situations [19]. As a result, children with ID may benefit from therapeutic approaches that are developmentally appropriate and capable of translating complex psychological concepts into concrete and engaging experiences [20]. Cognitive Behavioral Play Therapy (CBPT), which integrates principles of CBPT with structured play activities, has been recognized as a suitable intervention for children who may struggle with traditional verbally based therapies [21, 22]. The efficacy of CBPT lies in its capacity to use play as a medium for teaching cognitive and behavioral skills in a manner that aligns with children's developmental levels [23]. Through techniques such as modeling, role-playing, storytelling, and structured games, therapists can help children with ID identify emotions, challenge maladaptive thought patterns, and practice more adaptive behaviors [24, 25]. These interactive experiences provide opportunities for children to gradually develop emotional awareness, improve behavioral regulation, and strengthen problem-solving abilities [26]. Consequently, CBPT can serve as an effective therapeutic approach for enhancing psychological adjustment and promoting healthier behavioral and emotional functioning among children with ID [27].

Given the developmental and psychological challenges commonly experienced by children with ID, identifying effective interventions that address both behavioral and developmental outcomes is of considerable importance [28]. Behavioral problems may interfere with learning, social participation, and emotional well-being, while delays in gross motor skills can limit children's physical activity, independence, and engagement with their environment [29]. Therefore, interventions that can simultaneously support behavioral adjustment and developmental functioning are particularly valuable for this population. In this regard, the present study aims to examine the efficacy of CBPT on behavioral problems and gross motor skills in children with ID, with the ultimate goal of improving

their psychological functioning, enhancing their physical competence, and promoting more adaptive participation in daily and social activities.

Method and Materials

The present study employed an experimental design with a pre-test–post-test control group. The statistical population consisted of all mothers and educable children with ID, aged 7 to 10 years, enrolled in special education schools in Rasht, Guilan Province, during the 2025–2026 academic year. After obtaining permission from the Guilan Department of Education, a multistage sampling method was applied. First, two special education centers were randomly selected from the available centers. From a total of 120 educable children with ID, 49 children who exhibited clinical signs of behavioral problems in the classroom and school environment were identified based on reports from school principals and teachers. These children were then re-screened using a semi-structured clinical interview. Among the 49 assessed children, 38 were confirmed to have behavioral problems and were randomly assigned to either the experimental group (n = 19) or the control group (n = 19).

The sample size was determined and confirmed using G*Power based on an effect size of 0.40, a significance level of 0.05, and a statistical power of 0.80, which indicated a minimum required sample of 38 participants [30]. The inclusion criteria were: (a) being between 7 and 10 years of age, (b) having an IQ score between 55 and 70 based on the Wechsler Intelligence Scale and Leiter International Performance Scale recorded in school files, (c) presenting clinical signs of behavioral problems based on teachers' reports and clinical screening, and (d) obtaining parental consent for participation in the study. The exclusion criteria included: (a) absence from more than two intervention sessions, (b) withdrawal of parental consent at any stage of the study, (c) participation in any concurrent psychological or rehabilitation intervention during the study period, and (d) incomplete completion of the assessment measures at either the pre-test or post-test stage.

The research herein involved the administration of the following instruments:

Rutter Behavioral Problems Scale-2 (RBPS): The Rutter Behavioral Problems Scale-2 (RBPS) was used to assess children's behavioral problems [31]. This questionnaire was originally developed by Rutter in 1975 and consists of two forms: the parent form (A) and the teacher form (B). Form A includes 31 items and is completed by parents, while Form B contains 18 items and is completed by teachers. In the present study, the parent form was utilized, and mothers completed the questionnaire in approximately 35 minutes based on their child's behaviors over the past 12 months [31]. The RBPS comprises five subscales: aggression and hyperactivity, anxiety and depression, social maladjustment, antisocial behaviors, and attention deficit. Each item is scored on a 3-point scale (0, 1, and 2). A score of 2 is assigned if the statement accurately describes the child's behavior, a score of 1 if the statement partially applies, and a score of 0 if the statement does not apply at all. The total score ranges from 0 to 62, with a cutoff score of 13 indicating clinically significant behavioral problems. Rutter and colleagues reported both test–retest reliability and internal consistency of the scale at 0.74 over a two-month interval[31]. In the present study, the internal consistency of the scale was assessed using Cronbach's alpha, yielding a coefficient of 0.89 for the total score. In contrast, the reliability coefficients for the subscales ranged from 0.83 to 0.90, indicating satisfactory reliability.

Bruininks–Oseretsky Test of Motor Proficiency (BOTMP): The Bruininks–Nicolai Oseretsky Test of Motor Proficiency (BOTMP) was originally developed by Bruininks in 1978 through the revision of Nicolai Oseretsky's motor tests [32]. It is a norm-referenced assessment designed to evaluate motor performance in children aged 4.5 to 14.5 years. The complete form of the test consists of eight subtests, including 46 separate items, while the short form contains 14 items and assesses both gross and fine motor proficiency. Administration of the complete test requires approximately 45–60 minutes.

Four subtests assess gross motor skills, three subtests measure fine motor skills, and one subtest evaluates both domains [32]. In this study, gross motor proficiency scores were obtained from the combined standardized scores of the subtests related to running speed and agility, balance, and strength. The BOTMP is considered one of the most widely used and reliable instruments for assessing the development of fundamental motor skills. The test has demonstrated acceptable validity and reliability [32]. Its internal consistency, measured by Cronbach's alpha, has been reported as 0.92.

Cognitive-Behavioral Play Therapy Program Protocol: The program implemented in the present study was based on the protocol developed by Knell [33]. The intervention was delivered in 12 sessions, with each session lasting 60 minutes. The program was designed to target behavioral problems and gross motor skills in children with ID through structured play activities, emotional regulation strategies, problem-solving tasks, and motor skill exercises. The therapeutic process progressed from establishing rapport and emotional awareness to enhancing self-control, social interaction, gross motor coordination, and relapse prevention. A detailed description of the intervention sessions, including goals, session content, and homework assignments, is presented in Table 1. To address ethical considerations, the control group received the intervention in a condensed format after the completion of the post-test assessments.

Table 1) Cognitive-Behavioral Play Therapy Program Protocol

Session	Goals	Content	Homework
1	Building rapport and treatment orientation	Introduction, establishing trust, familiarization with the play environment, and engaging the child in enjoyable activities to increase motivation.	Drawing or talking about favorite games and activities at home.
2	Emotional recognition and expression	Using emotion cards, masks, and role-play to identify basic emotions (happiness, anger, sadness, fear) and express them appropriately.	Practice identifying emotions in daily situations with parents.
3	Behavioral awareness and self-control	Teaching the relationship between thoughts, feelings, and behaviors through storytelling and play activities; recognizing inappropriate behaviors.	Record one positive and one negative behavior each day.
4	Anger management and emotional regulation	Teaching coping strategies such as deep breathing, counting, and relaxation through games and role-play.	Practice calming strategies during stressful situations.
5	Social skills development	Practicing turn-taking, sharing, cooperation, and following rules through structured group games.	Practice sharing and cooperation with family members.
6	Problem-solving skills	Teaching simple problem-solving steps (identify problem, think of solutions, choose the best one) using play scenarios.	Solve one simple daily-life problem with parental support.
7	Gross motor skill development: balance and coordination	Activities such as walking on lines, balancing on one foot, jumping, and obstacle courses to improve coordination and balance.	Practice balancing and jumping exercises for 10 minutes daily.
8	Gross motor skill development: strength and body control	Activities including ball throwing/catching, climbing, crawling, and pushing/pulling games to improve strength and control.	Practice ball games with parents or peers.
9	Attention and impulse control	Games requiring focus, waiting, and inhibitory control (e.g., "Red Light, Green Light," Simon Says).	Practice waiting for your turn and following instructions at home.
10	Self-confidence and positive self-talk	Teaching children to replace negative self-talk with positive coping statements through play and storytelling.	Use positive self-statements in challenging situations.
11	Exposure to challenging tasks and persistence	Encouraging children to face difficult tasks gradually, increasing tolerance for frustration and persistence in motor and behavioral tasks.	Complete one challenging task at home and report the experience.
12	Consolidation and relapse prevention	Reviewing all learned behavioral, emotional, and motor skills; reinforcing progress; preparing parents for continued support at home.	Continue practicing learned skills and maintain a reward system.

Descriptive statistics (means, standard deviations) and inferential statistics (MANCOVA) were used in the analysis of the data after the confirmation of the validity of the test of assumptions was performed. All statistical analyses were performed using IBM SPSS Statistics, with significance set at $p < 0.05$.

Findings

The experimental and control group children have an average age of 8.57 ± 4.16 years and 8.92 ± 4.85 years, respectively. No significant differences were observed in the primary demographic variables between the children in the intervention and control groups, as confirmed by a chi-square test (p>0.05). Table 2 displays the means and standard deviations for children with ID who participated in the experimental and control groups on pre- and post-test measures of behavioral problems and gross motor skills. To ascertain if data followed the normal distribution, the Shapiro-Wilk (S-W) test was applied for both variables, and the data presented in Table 2 showed no statistically significant difference. This means the data were distributed normally, which allows applying the parametric test further.

Table 2) Descriptive Indices of the Study's Variables in Control and Intervention Groups

Variables	Stage	Groups	Mean	SD	S-W	P*
Aggression and Hyperactivity	Pre-test	Intervention	9.36	1.28	0.157	0.087
		Control	9.10	1.03	0.115	
	Post-test	Intervention	5.73	1.69	0.103	0.054
		Control	9.63	1.07	0.109	
Anxiety and Depression	Pre-test	Intervention	8.36	1.19	0.110	0.051
		Control	8.57	1.59	0.101	
	Post-test	Intervention	5.26	1.08	0.094	0.064
		Control	8.05	1.67	0.115	
Social Maladjustment	Pre-test	Intervention	10.42	1.50	0.107	0.052
		Control	10.05	1.44	0.099	
	Post-test	Intervention	6.73	1.35	0.087	0.058
		Control	10.78	1.82	0.084	
Antisocial Behaviors	Pre-test	Intervention	9.47	1.09	0.115	0.070
		Control	9.78	1.63	0.109	
	Post-test	Intervention	5.36	1.55	0.117	0.059
		Control	9.01	1.21	0.120	
	Pre-test	Intervention	10.42	1.39	0.098	0.055
Attention Deficit		Control	9.89	1.72	0.119	
	Post-test	Intervention	6.37	1.29	0.088	0.071
		Control	10.89	1.04	0.105	
	Pre-test	Intervention	23.64	1.66	0.102	0.062
Gross Motor Skills		Control	24.16	2.54	0.099	
	Post-test	Intervention	27.68	2.30	0.115	0.058
		Control	23.21	1.97	0.129	

* Shapiro-Wilk test

To assess the effect of CBPT on behavioral problems and gross motor skills in children with ID, a MANCOVA was carried out. In general, assumption testing proved that the MANCOVA was appropriate to proceed. Levene's test for equality of variances of group variances showed no significant differences in variance between the groups for behavioral problems ($F = 0.82$, $p > 0.05$) and gross motor skills ($F = 0.89$, $p > 0.05$). Additionally, there were no significant differences between the experimental and control groups in Box's M test for the equality of covariance matrices (Box's $M = 46.09$, $F = 1.78$, $p = 0.069$), suggesting the assumption of homogeneity of covariance was acceptable ($p > 0.05$).

Bartlett's chi-square test also indicated a significant association between behavioral problems and gross motor skills ($p < 0.05$), justifying the use of multivariate analysis. In addition, the assumption of homogeneity of regression slopes was investigated using a multivariate F-test for interaction between the covariates and the experimental variable across both the pre-test and post-test periods. Non-significant interactions (p>0.05) support the consistency in slopes across groups. Based on the aforementioned assumption, the MANCOVA was performed, and the results are illustrated in Table 3.

Table 3) The Results of Multivariate Analysis of Covariance on Mean Post-Test Scores

Test	Value	F	df	Error df	P	Effect Value
Pillai's Trace	0.772	14.094	6	25	<0.001	0.77
Wilks Lambda	0.228	14.094	6	25	<0.001	0.77
Hotelling Trace	3.382	14.094	6	25	<0.001	0.77
Roy's Largest Root	3.382	14.094	6	25	<0.001	0.77

As Table 3 revealed, the independent variable had a significant influence on the dependent measures, as evidenced by significant group differences in either behavioral problems or gross motor skills. The effect size indicated that the independent variable accounted for 77% of the variation between the experimental and control groups, and the power was 1.00, indicating an adequate sample size for identifying significant effects. To establish exactly where the difference between the two groups arose from, an ANCOVA within the MANCOVA procedures was then performed, and the result is presented in Table 4.

Table 4) Results of Univariate Analysis of Covariance on the Mean of Post-Test Scores of Dependent Variables in Intervention and Control Groups

Variables	SS	SS Error	DF	MS	MS Error	F	P	Effect Value
Aggression and Hyperactivity	131.90	62.03	1	131.90	2.06	63.79	<0.001	0.68
Anxiety and Depression	56.27	45.18	1	56.27	1.50	37.36	<0.001	0.56
Social Maladjustment	144.72	78.41	1	144.72	2.61	55.36	<0.001	0.65
Antisocial Behaviors	105.21	62.73	1	105.21	2.09	50.31	<0.001	0.63
Attention Deficit	176.67	85.75	1	176.67	2.85	61.81	<0.001	0.67
Gross Motor Skills	208.46	80.41	1	208.46	2.68	77.78	<0.001	0.72

The findings summarized in Table 4 showed the F values for aggression and hyperactivity (F = 63.79), anxiety and depression (F = 37.36), social maladjustment (F = 55.36), antisocial behaviors (F = 50.31), attention deficit (F = 61.81) and gross motor skills (F = 77.78) were all significant at p<.001, indicating significant group differences in these aspects. Effect size estimates showed the effect size of the independent variable (independent samplesttestbetween two groups of interest (t=-3.86, df = 40), effect size= 68%) for aggression and hyperactivity; effect size= 56% for anxiety and depression; effect size= 65% for social maladjustment; effect size= 63% for antisocial behavior; effect size= 67% for attention deficit; effect size= 72% for gross motor skill. Overall, CBPT achieved therapeutic effects by not only reducing behavior problems but also improving gross motor skills in children with ID.

Discussion

The present study aimed to examine the efficacy of CBPT on behavioral problems and gross motor skills in children with ID. Children with ID often face a combination of cognitive, behavioral, and motor challenges that can interfere with their overall development and daily functioning. These difficulties may limit their participation in social interactions, educational activities, and physical play. Therefore, identifying therapeutic approaches that are developmentally appropriate and capable of addressing both behavioral and motor domains is particularly important. The findings of the present study indicated that CBPT was effective in reducing behavioral problems and improving gross motor skills among children with ID.

First, the results showed that CBPT contributed to a reduction in behavioral problems among children with ID. Many behavioral difficulties observed in children with ID are associated with limitations in emotional understanding, frustration tolerance, and the ability to express needs or

regulate impulses [25]. Cognitive Behavioral Play Therapy provides a structured yet engaging environment in which children can explore emotions and behaviors through play-based activities [18]. Because play is a natural mode of expression for children, it allows therapists to address behavioral patterns indirectly while maintaining the child's engagement and motivation during therapy sessions [33]. Moreover, CBPT incorporates cognitive-behavioral principles that help children gradually learn more adaptive ways of thinking and responding to challenging situations. Through role-playing, modeling, and guided play scenarios, children can practice appropriate behavioral responses, develop better emotional awareness, and improve self-control [20]. These experiences allow children to internalize new coping strategies and behavioral patterns, which can reduce disruptive behaviors such as aggression, impulsivity, and noncompliance. As children gain greater control over their emotional and behavioral responses, they become better able to interact with peers, teachers, and family members in a more positive and socially appropriate manner [19].

Second, the findings indicated that CBPT was effective in improving gross motor skills in children with ID. Motor development in these children is often delayed due to difficulties in coordination, motor planning, and limited opportunities for active physical engagement. Within CBPT sessions, many therapeutic activities involve movement-based play, interactive games, and physical exploration of the environment [22]. These activities provide repeated opportunities for children to engage their large muscle groups, practice coordination, and improve balance and body control in a supportive and enjoyable setting [23]. In addition, the motivational nature of play may encourage children to participate more actively in physical activities than in more traditional instructional settings. When motor tasks are embedded within playful and goal-directed therapeutic exercises, children may feel less pressure and greater enjoyment while practicing movement skills [29]. This increased engagement can lead to more frequent practice and gradual improvement in fundamental motor abilities such as running, jumping, and coordinated body movement. Over time, improvements in gross motor skills may also enhance children's confidence, participation in play with peers, and overall physical functioning [28].

Notwithstanding the significant findings of the present study, several limitations should be acknowledged. The relatively small sample size and the recruitment of participants from a single urban region may restrict the external validity and generalizability of the findings to broader populations of children with ID. Furthermore, the absence of a longitudinal follow-up limits the ability to determine the durability and maintenance of treatment effects over time. Another limitation concerns the reliance on parent-reported behavioral assessments, which may be influenced by subjective bias and social desirability. Future research should address these limitations by employing larger and more heterogeneous samples, incorporating multi-informant assessment approaches (e.g., parents, teachers, and clinicians), and implementing follow-up evaluations to examine the long-term effectiveness of CBPT. From an applied perspective, the present findings provide empirical support for integrating CBPT into special education curricula and rehabilitation services as an evidence-based intervention to reduce behavioral difficulties and enhance motor functioning in children with ID. Additionally, structured training for therapists, educators, and caregivers on implementing CBPT protocols may help improve intervention fidelity and maximize therapeutic outcomes.

Conclusion

Overall, the findings of this study highlight the potential value of CBPT as an integrated intervention that supports both behavioral regulation and motor development in children with ID. By combining cognitive-behavioral strategies with the natural therapeutic power of play, CBPT creates an environment in which children can learn new skills through active experience and interaction. Such improvements may contribute not only to reduced behavioral difficulties and enhanced motor competence but also to broader developmental gains in social participation,

independence, and overall quality of life for children with ID.

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Authors' Contributions
All authors contributed equally to the conception and design of the study, data collection, analysis and interpretation of data, and preparation of the manuscript. All authors read and approved the final version of the manuscript.

Conflict of Interest
The authors declare no conflicts of interest.

Ethical Approval
Compliance with ethical principles in manuscript preparation was ensured through adherence to the guidelines of the National Ethics Committee and the Committee on Publication Ethics (COPE). Informed consent was obtained from all participants' parents or legal guardians before participation in the study.

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